

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (currently amended): A method for processing  
2 ingress data by an edge device of a transport network, the  
3 method comprising:  
4 a) determining a first label and a second label using  
5 ~~based on~~ layer 2 destination information of the  
6 ingress data;  
7 b) adding the first and second labels to the data to  
8 generate modified data; and  
9 c) using the first label to forward the modified data  
10 towards an egress edge device of the transport network  
11 wherein the second label is to be used by the  
12 egress edge device to associate the ingress data with a  
13 destination device and a channel, and  
14 wherein the edge device is a different node from  
15 the egress edge device, and is separated from the egress  
16 edge device by at least one communications link of a  
17 transport network.

1 Claim 2 (original): The method of claim 1 further  
2 comprising:  
3 a1) removing the destination information of the  
4 ingress data.

1 Claim 3 (original): The method of claim 1 further  
2 comprising:  
3 b1) encapsulating the modified data.

1 Claim 4 (original): The method of claim 1 wherein the  
2 destination information of the ingress data is represented  
3 by a logical identifier.

1 Claim 5 (original): The method of claim 4 wherein the  
2 logical identifier is associated with a unique virtual  
3 private network.

1 Claim 6 (currently amended): The method of claim 5 wherein  
2 the logical identifier and the virtual private network are  
3 used to determine ~~determined~~ the egress edge device  
4 associated with the first label.

1 Claim 7 (currently amended): The method of claim 5 wherein  
2 the logical identifier and the virtual private network are  
3 used to determine ~~determined~~ the destination device and  
4 channel associated with the second label.

1 Claim 8 (original): The method of claim 7 wherein the  
2 second label and the advertisement of the egress edge  
3 device are used to determine the channel to the destination  
4 device.

1 Claim 9 (original): A method for processing egress data,  
2 having a first label and a second label, by an edge device  
3 of a transport network, the method comprising:  
4 a) determining a channel to a destination customer  
5 edge device based on the second label;  
6 b) forwarding the egress data on the channel  
7 determined.

1 Claim 10 (original): The method of claim 9 wherein the  
2 second label was derived from an identifier of the  
3 destination customer edge device, and a label base of a  
4 source customer edge device.

1 Claim 11 (original): The method of claim 10 wherein the  
2 second label was mapped from a channel identifier for the  
3 destination customer edge device used by the source  
4 customer edge device.

1 Claim 12 (original): The method of claim 11 wherein the  
2 channel identifiers for the destination customer devices  
3 used by the source customer edge device and the destination  
4 customer edge device may be different.

1 Claim 13 (original): A method for generating, by a  
2 transport network edge device, information about a newly  
3 added customer edge device belonging to a virtual private  
4 network, to be disseminated to other edge devices of the  
5 transport network, the method comprising:  
6 a) obtaining a label base value and a range value  
7 associated with the newly added customer edge device;  
8 b) generating at least one message, the at least one  
9 message collectively including  
10 i) a first field for identifying the transport  
11 network edge device;  
12 ii) a second field for identifying the virtual  
13 private network to which the newly added customer  
14 edge device belongs;  
15 iii) a third field for identifying the newly  
16 added customer edge device;

17           iv) a fourth field for identifying the range  
18           value; and  
19           v) a fifth field for identifying the label base.

1 Claim 14 (original): The method of claim 13 further  
2 comprising:  
3       - defining a set of labels based on the label base  
4       value and the range value.

1 Claim 15 (original): The method of claim 14 wherein the  
2 set of labels is contiguous.

1 Claim 16 (original): The method of claim 13 wherein a  
2 value in the third field for identifying the newly added  
3 customer edge device is unique within the virtual private  
4 network identified in the second field.

1 Claim 17 (original): The method of claim 13 further  
2 comprising:  
3       c) sending the message towards other edge devices of  
4       the transport network.

1 Claim 18 (original): The method of claim 17 wherein the  
2 message is sent using a label distribution protocol.

1 Claim 19 (original): The method of claim 17 wherein the  
2 message is sent using a border gateway protocol.

1 Claim 20 (original): The method of claim 13 wherein the at  
2 least one message further includes  
3       vi) a sixth field for defining an encapsulation type  
4       used by the newly added customer edge device.

1 Claim 21 (original): The method of claim 13 wherein the  
2 range value the newly added customer edge device  
3 corresponds to a number of elements in a list of channel  
4 identifiers provisioned at the newly added customer edge  
5 device.

1 Claim 22 (original): A method for processing, by a first  
2 transport network edge device, information about a newly  
3 added customer edge device belonging to a virtual private  
4 network, the method comprising:  
5 for a second customer edge device, belonging to the  
6 virtual private network and attached to the first transport  
7 network edge device,  
8 a) determining a first label for getting to a second  
9 transport network edge device sourcing the information  
10 about the newly added customer edge device,  
11 b) determining a second label for reaching the newly  
12 added customer edge device from the second transport  
13 network device,  
14 c) determining a third label for data from the newly  
15 added customer edge device to reach the second  
16 customer edge device from the first transport network  
17 edge device,  
18 d) determining a first route mapping an identifier of  
19 the newly added customer edge device, used by the  
20 second customer edge device, to the first label and  
21 the second label, and  
22 e) determining a second route mapping the third label  
23 to a channel identifier of the second customer edge  
24 device.

1 Claim 23 (original): The method of claim 22 wherein the  
2 information about a newly added customer edge device  
3 belonging to a virtual private network includes:  
4 - a first value identifying the second transport  
5 network edge device;  
6 - a second value identifying the virtual private  
7 network;  
8 - a third value identifying the newly added customer  
9 edge device;  
10 - a fourth value identifying a range associated with  
11 the newly added customer edge device; and  
12 - a fifth value identifying a label base associated  
13 with the newly added customer edge device.

1 Claim 24 (original): The method of claim 22 wherein the  
2 act of determining a first label for getting to the second  
3 transport network edge device is based on a label  
4 distribution protocol.

1 Claim 25 (currently amended): The method of claim 24  
2 wherein the label distribution protocol is a protocol  
3 selected from a group consisting of (A) resource  
4 reservation protocol-traffic extension ~~RSVP-TE~~, (B) label  
5 distribution protocol ~~LDP~~, and constraint-based label  
6 distribution protocol ~~(CR-LDP)~~.

1 Claim 26 (original): The method of claim 22 wherein the  
2 act of determining a second label for reaching the newly  
3 added customer edge device from the second transport  
4 network edge device includes determining a function of a  
5 label base of the newly added customer edge device and a

6 value derived from an identifier of the second customer  
7 edge device.

1 Claim 27 (original): The method of claim 22 wherein the  
2 act of determining a third label for data from the newly  
3 added customer edge device to reach the second customer  
4 edge device includes determining a function of a label base  
5 of the second customer edge device and a value derived from  
6 the identifier of the newly added customer edge device.

1 Claim 28 (original): The method of claim 22 wherein the  
2 range associated with the newly added customer edge device  
3 corresponds to a number of elements in a list of channel  
4 identifiers provisioned at the newly added customer edge  
5 device.

1 Claim 29 (original): The method of claim 22 further  
2 comprising determining whether an encapsulation type used  
3 by the second customer edge device is compatible with that  
4 used by the newly added customer edge device.

1 Claim 30 (original): The method of claim 22 further  
2 comprising determining whether any address conflicts exist  
3 within the virtual private network based on the second  
4 customer edge device and the newly added customer edge  
5 device.

1 Claim 31 (original): The method of claim 22 further  
2 comprising determining whether the second customer edge  
3 device has sufficient unused channel identifiers to  
4 accommodate the newly added customer edge device.

1 Claim 32 (original): A device for use at the edge of a  
2 layer 2 transport network, the device comprising:  
3 a) a storage facility for storing  
4 i) a first route mapping a channel identifier  
5 corresponding to a destination customer edge  
6 device to a first label for forwarding data to a  
7 proper egress service provider edge device and a  
8 second label for forwarding data from the proper  
9 egress service provider edge device to the  
10 destination customer edge device, and  
11 ii) a second route mapping an ingress second  
12 label to a channel identifier associated with a  
13 destination customer edge device; and  
14 b) a forwarding facility for  
15 i) forwarding ingress data to an egress service  
16 provider edge device based on the first route,  
17 and  
18 ii) forwarding egress data to a destination  
19 customer edge device based on the second route.

1 Claim 33 (original): The device of claim 32 further  
2 comprising:  
3 c) a configuration facility for determining the first  
4 and second routes stored in the storage facility based  
5 on received advertisements about newly added customer  
6 edge devices.

1 Claim 34 (original): The device of claim 32 further  
2 comprising:  
3 c) a signaling facility for signaling information  
4 about a newly added customer edge device coupled with



5       the device, to other devices at the edge of the layer  
6       2 transport network.

1   Claim 35 (original):   The device of claim 34 where the  
2   information about a newly added customer edge device  
3   includes:  
4       - a first value identifying the device;  
5       - a second value identifying a virtual private  
6       network to which the newly added customer edge device  
7       belongs;  
8       - a third value identifying the newly added customer  
9       edge device;  
10      - a fourth value identifying a range associated with  
11      the newly added customer edge device; and  
12      - a fifth value identifying a label base associated  
13      with the newly added customer edge device.

1   Claim 36 (original):   The device of claim 35 wherein the  
2   range associated with the newly added customer edge device  
3   corresponds to a number of elements in a list of channel  
4   identifiers provisioned at the newly added customer edge  
5   device.

1   Claim 37 (original):   A layer 2 transport network for use  
2   by a source customer edge device and a destination customer  
3   edge device, both belonging to a same virtual private  
4   network, the source customer edge device having a list of  
5   channel identifiers for each customer edge device of the  
6   virtual private network, the layer 2 network comprising:  
7       a) a first transport network edge device, the first  
8       transport network edge device coupled with the source  
9       customer edge device and having

10 i) a storage facility for storing a first route  
11 mapping a first channel identifier, used by the  
12 source customer edge device and corresponding to  
13 the destination customer edge device, to a first  
14 label for forwarding data to a second transport  
15 network edge device and a second label associated  
16 with the destination customer edge device, and  
17 ii) a forwarding facility for forwarding data  
18 addressed to the destination customer edge device  
19 to the second transport network edge device based  
20 on the first label of the first route; and  
21 b) the second transport network edge device, the  
22 second transport network edge device coupled with the  
23 destination edge device and having  
24 i) a storage facility for storing a second route  
25 mapping the second label to a second channel  
26 identifier associated with the destination  
27 customer edge device; and  
28 ii) a forwarding facility for forwarding the  
29 data to the destination customer edge device  
30 based on the second channel identifier of the  
31 second route.

1 Claim 38 (original): The layer 2 transport network of  
2 claim 37 wherein each of the first channel identifier and  
3 the second channel identifier is associated with the  
4 destination customer edge device, and  
5 wherein the first channel identifier may be different  
6 from the second channel identifier.

1 Claim 39 (currently amended): In an edge device of a  
2 service provider transport network, a machine-readable

3 medium having stored thereon a data structure, the data  
4 structure comprising:  
5 a) a first list of virtual private networks supported  
6 by the service provider transport network;  
7 b) for each of the virtual private networks of the  
8 list, a second list of customer edge devices belonging  
9 to the virtual private network;  
10 c) for each of the customer edge devices of the  
11 second list,  
12 i) a first field for storing a label base, and  
13 ii) a second field for storing a label range.

1 Claim 40 (original): The machine-readable medium of claim  
2 39 further comprising a third field for storing an  
3 encapsulation type for each of the customer edge devices of  
4 the second list.

1 Claim 41 (original): The machine-readable medium of claim  
2 39 wherein the range corresponds to a number of elements in  
3 a list of channel identifiers provisioned at the customer  
4 edge device.

1 Claim 42 (original): In an edge device of a service  
2 provider transport network, a machine-readable medium  
3 having stored thereon a data structure, the data structure  
4 comprising:  
5 a) a first list of virtual private networks supported  
6 by the service provider transport network;  
7 b) for each of the virtual private networks of the  
8 list, a second list of customer edge devices belonging  
9 to the virtual private network;

10           c) for each of the customer edge devices of the  
11           second list, a third list of channel identifiers.

1   Claim 43 (original): The machine-readable medium of claim  
2   42 further comprising:

3           d) for each of the channel identifiers of the third  
4           list,  
5                i) first route mapping a channel identifier to a  
6                first label for forwarding ingress data to a  
7                proper egress service provider edge device and a  
8                second label for forwarding ingress data from the  
9                proper egress service provider edge device to a  
10              destination customer edge device, and  
11              ii) a second route mapping a second label of  
12              egress data to a channel identifier associated  
13              with a destination customer edge device.

1   Claim 44 (currently amended): A machine-readable medium  
2   having stored thereon a message data structure, the message  
3   data structure comprising:

4           a) a first field identifying a transport network edge  
5           device which sourced the message data structure;  
6           b) a second field identifying a virtual private  
7           network to which a given customer edge device,  
8           connected with the transport network edge device,  
9           belongs;  
10          c) a third field identifying the given customer edge  
11          device;  
12          d) a fourth field identifying a label range  
13          associated with the given customer edge device; and  
14          e) a fifth field identifying a label base associated  
15          with the given customer edge device.

1 Claim 45 (original): The machine-readable medium of claim  
2 44 wherein the message data structure is used to advertise  
3 information about the given customer edge device to other  
4 edge devices of a layer-2 transport network.

1 Claim 46 (original): The machine-readable medium of claim  
2 44 wherein the range associated with the given customer  
3 edge device corresponds to a number of elements in a list  
4 of channel identifiers provisioned at the given customer  
5 edge device.

1 Claim 47 (currently amended): A device for use at the edge  
2 of a layer 2 transport network, the device comprising:  
3 a) a storage facility for storing a route mapping a  
4 channel identifier corresponding to a destination  
5 customer edge device to a label for forwarding data to  
6 a proper egress service provider edge device and a  
7 second label for forwarding data from the proper  
8 egress service provider edge device to the destination  
9 customer edge device; and  
10 b) a forwarding facility for forwarding ingress data  
11 to an egress service provider edge device based on the  
12 route,  
13 wherein the device is a different node from the  
14 egress service provider edge device, and is separated from  
15 the egress service provider edge device by at least one  
16 communications link of a transport network.

1 Claim 48 (original): A device for use at the edge of a  
2 layer 2 transport network, the device comprising:

3       a) a storage facility for storing a route mapping an  
4       ingress label to a channel identifier associated with  
5       a destination customer edge device; and  
6       b) a forwarding facility for forwarding egress data  
7       to a destination customer edge device based on the  
8       route.